

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant : Paul T. Bender                      Art Unit : 3657  
Serial No. : 10/657,496                      Examiner : Mariano Ong Sy  
Filed : September 8, 2003                      Conf. No. : 9342  
Title : FAILSAFE OPERATION OF ACTIVE VEHICLE SUSPENSION

**Mail Stop Appeal Brief - Patents**

Hon. Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

APPEAL BRIEF

- (i) *Real Party in Interest.*

Bose Corporation.

- (ii) *Related Appeals and Interferences.*

None.

- (iii) *Status of Claims.*

Claims 1 and 6 being appealed stand rejected under 35 U.S.C. § 102(b) as anticipated by Patil. Claims 3-5, 7-9 and 11 being appealed stand rejected under 35 U.S.C. § 103(a) as unpatentable over Patil as primary reference in view of Murdy as a secondary reference. Claims 2, 10 and 12-72 are cancelled.

- (iv) *Status of Amendments.*

An amendment filed 7 July 2010 has been entered.

- (v) *Summary of Claimed Subject Matter.*

Regarding claim 1, an active vehicle suspension system with fail-safe operation includes an actuator with an armature and stator, such as 14 and 16 in FIG.1, P.7, ll.16-24. The stator has

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at least one coil with coil ends shown in FIG. 2. Power electronics, such as 54 in FIG. 2, is connected to the coil ends constructed and arranged to deliver power to the actuator through the coil ends. A fail-safe clamping circuit, such as 77, in FIG. 2, is connected to the coil ends powered by energy produced from movement of the actuator that is directly conveyed to the clamping circuit from the coil ends to passively damp the actuator during the failure of the power electronics by clamping the coil ends together. Page 7 line 27, Page 8 line 15.

(vi) *Grounds of Rejection to be Reviewed on Appeal.*

1. Whether claims 1 and 6 are anticipated by Patil under 35 U.S.C. § 102(b).
2. Whether claims 3-5, 7-9 and 11 are unpatentable over Patil as a primary reference in view of Murty as a secondary reference under 35 U.S.C. 103.

(vii) *Argument.*

I. CLAIMS 1 AND 6 ARE NOT ANTICIPATED BY PATIL AT LEAST BECAUSE THE REFERENCE DOES NOT DISCLOSE EACH AND EVERY ELEMENT IN THESE CLAIMS PROPERLY INTERPRETED IN LIGHT OF THE SPECIFICATION AS WOULD BE INTERPRETED BY ONE OF ORDINARY SKILL IN THE ART ARRANGED AS IN THE CLAIMS

The final office action states:

5. Claims 1 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Patil et al. (US 5,070,284).

Patil et al. disclosed an active vehicle suspension with fail-safe operation comprising: an actuator 100 with an armature and a stator, the stator having at least one coil with coil ends, power electronics connected to the coil ends to deliver power to the actuator through the coil ends, and a fail-safe clamping circuit 118, 120, 138 connected to the coil ends powered by energy produced from the movement of the actuator that is directly conveyed to the clamping circuit from the coil ends, to passively damp the actuator during a failure of the power electronics by clamping the coil ends together through relay 120; wherein when the machine 104 is operated as an alternator in the fail-safe mode,, electric currents are generated by the rotation of the armature via the screw threads 112 and the screw cage 106, and the generation of electric currents will definitely generate a back electromotive force which powers the clamping circuit through the coil assembly. P.3

This ground of rejection is respectfully traversed.

"It is well settled that anticipation under 35 U.S.C. 102 requires the presence in a single reference of all of the elements of a claimed invention." *Ex parte Chopra*, 229 U.S.P.Q. 230, 231 (BPA&I 1985) and cases cited.

"Anticipation requires the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the claim." *Connell v. Sears, Roebuck & Co.*, 220 U.S.P.Q. 193, 198 (Fed. Cir. 1983).

"This court has repeatedly stated that the defense of lack of novelty (i.e., 'anticipation') can only be established by a single prior art reference which discloses each and every element of the claimed invention." *Structural Rubber Prod. Co. v. Park Rubber Co.*, 223 U.S.P.Q. 1264, 1270 (Fed. Cir. 1984), citing five prior Federal Circuit decisions since 1983 including *Connell*.

In a later analogous case the Court of Appeals for the Federal Circuit again applied this rule in reversing a denial of a motion for judgment n.o.v. after a jury finding that claims were anticipated. *Jamesbury Corp. v. Litton Industrial Prod., Inc.*, 225 U.S.P.Q. 253 (Fed. Cir. 1985).

After quoting from *Connell*, "Anticipation requires the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the claim," 225 U.S.P.Q. at 256, the court observed that the patentee accomplished a constant tight contact in a ball valve by a lip on the seal or ring which interferes with the placement of the ball. The lip protruded into the area where the ball will be placed and was thus deflected after the ball was assembled into the valve. Because of this constant pressure, the patented valve was described as providing a particularly good seal when regulating a low pressure stream. The court quoted with approval from a 1967 Court of Claims decision adopting the opinion of then Commissioner and later Judge Donald E. Lane:

[T]he term "engaging the ball" recited in claims 7 and 8 means that the lip contacts the ball with sufficient force to provide a fluid tight seal. \*\*\* The Saunders flange or lip only sealingly engages the ball 1 on the upstream side when the fluid pressure forces the lip against the ball and never sealingly engages the ball on the downstream side because there is no fluid pressure there to force the lip against the ball. The Saunders sealing ring provides a compression type of seal which depends upon the ball pressing into the material of the ring. \*\*\* The seal of Saunders depends primarily on the contact between the ball and the body of the sealing ring, and the flange or lip sealingly contacts the ball on the upstream side when the fluid pressure increases. 225 U.S.P.Q. at 258.

Relying on *Jamesbury*, the ITC said, "Anticipation requires looking at a reference, and comparing the disclosure of the reference with the claims of the patent in suit. A claimed device is anticipated if a single prior art reference discloses all the elements of the claimed invention as arranged in the claim." *In re Certain Floppy Disk Drives and Components Thereof*, 227 U.S.P.Q. 982, 985 (U.S. ITC 1985).

In *Ex parte Aylward*, (BPA&I, Appeal No. 2007-2368 December 4, 2007) the Board said in reversing a final rejection:

"Both anticipation under §102 and obviousness under §103 are two-step inquiries. The first step in both analyses is a proper construction of the claims . . . . The second step in the analysis requires a comparison of the properly constructed claims to the prior art". *Medichem, S.A. v. Rolabo, S.L.*, 353 F. 3d 928, 933 (Fed. Cir. 2003) (internal citations omitted):

#### A. CLAIM CONSTRUCTION

"The Patent and Trademark Office (PTO) must consider all claim limitations when determining patentability of an invention over the prior art." *In re Lowry* 32 F. 3d 1579, 1582 (Fed. Cir. 1994) (citing *In re Gulack*, 703 F. 2d. 1381, 1385 (Fed. Cir. 1983). Slip Op. Pp. 7-8.

The pertinence of the specification to claim construction is reinforced by the manner in which a patent is issued. The Patent and Trademark Office ("PTO") determines the scope of claims in patent applications not solely on the basis of the claim language, but upon giving claims their broadest reasonable construction "in light of the specification as it would be interpreted by one of ordinary skill in the art." *In re Acad. Of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004). *Phillips v. AWH Corp.*, 76 U.S.P.Q. 1321, 1329 (Fed. Cir. 2005) (en banc).

Thus, the first step involves a question of law on the interpretation of the rejected claims in the light of the specification as they would be interpreted by one of ordinary skill in the art.

The present claimed invention uses power generated by the actuator to cause the normally open switch, such as 79 in FIG. 2 to be closed. Paragraphs 40 and 41 of the published application reads as follows:

[0040] In order to provide the failsafe clamping function, circuit 77 should provide power to enable, by closing, the normally-open switch 79. This power can be provided by a storage device such as a battery or a capacitor. However,

solutions that utilize a storage device are susceptible to failure if the storage device fails.

[0041] Another manner of providing power to enable the normally-open switch 79 is to use power associated with the back EMF. If the armature 14 is not moving relative to the stator 16, no damping force needs to be provided and the normally-open switch 79 can remain open. However, when the armature 14 begins to move relative to the stator 16, the switch 79 must be closed.

Energy from movement of actuator 12 is then conveyed directly to the switch circuitry, such as failsafe clamping circuit 77, to positively damp the actuator during a failure of the power supply, such as power electronics 54, that is for providing power to actuator 12.

The title of this application is "FAILSAFE OPERATION OF ACTIVE VEHICLE SUSPENSION."

The power the invention needs to hold the switch closed is analogous to the power provided by the "suspension enabled" line of the reference. The difference is that in the reference, normally closed relays are used. That is to say, no power is required in order to hold the relays closed; that is their normal state. Power is required to hold them open. The reference describes the relay as having normally closed and normally open contacts; however, it can be seen that the normally closed contacts are the ones that connect a failsafe load in the event of a failure in the system. If there was a failure, power to operate the electronics may not be available, and using the normally closed contacts ensures that the leads get clamped, and the failsafe damping resistors are used when the failure occurs. The reference does not describe where the "suspension enable" signal power comes from. The reference clearly fails to disclose that it is provided by the back EMF generated from motion of the actuator as disclosed and claimed in this application.

"A reference is only good for what it clearly and definitely discloses." *In re Hughes*, 145 U.S.P.Q. 467 (C.C.P.A. 1965); *In re Moreton*, 129 U.S.P.Q. 227, 230 (C.C.P.A. 1961).

Because the system claimed here uses a normally open switch, (High power normally closed solid state relays do not exist.), in the event of failure the invention applies power from somewhere to operate the switch so that the switch contacts can be closed. The invention disclosed and claimed in this application obtains this power from the movement of the actuator

directly. The power to hold the switch closed is different from the power that flows through the switch when the switch is closed.

The reference fails to disclose "fail-safe clamping circuit connected to coil ends powered by energy produced from movement of the actuator" as called for by the claims. The reference therefore does not anticipate the rejected claims.

If this ground of rejection were maintained, the Examiner was respectfully requested to quote *verbatim* the language in the reference regarded as corresponded to this limitation in the claims. The Examiner did not and cannot comply with this request.

## II. CLAIMS 3-5, 7-0 AND 11 ARE PATENTABLE OVE PATIL AS A PRIMARY REFERENCE IN VIEW OF MURTY AS A SECONDARY REFERENCE AT LEAST BECAUSE IT IS IMPOSSIBLE TO COMBINE THE REFERENCES TO MEET THE LIMITATIONS OF THESE CLAIMS

The final action states:

7. Claims 3-5, 7-9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Patil et al. in view of Murty (US 4,815,575).

Re-claims 3 and 4 Patil et al. failed to disclose multiple coils and the clamping circuit electrically connects coil ends together to change the passive damping characteristic of the actuator and failed to disclose the clamping circuit comprises a solid-state device.

Murty teaches, as shown in fig. 2, the use of a multiple-phase coil assembly A, B, C, a MOSFET normally-open solid state switch 30, which is a silicon device, electrically connecting at least one coil end, see col. 3, lines 52-57.

It would have been obvious to one of ordinary skill in the art to merely provide the suspension system of Patil et al. with the known multiple-phase coil assembly which is a MOSFET normally-open solid-state switch and the switch electrically connecting at least one coil end, as taught by Murty, in order to change the passive damping characteristic of the actuator.

Re-claim 5 Patil et al. disclosed the clamping circuit comprising a rectifier 118 and a single unidirectional switch.

Re-claims 7 and 8, Patil et al. failed to disclose the use of a supplemental circuit, which comprises a bipolar Royer oscillator capable of operating at an input voltage of approximately 0.5 volts, for boosting the back EMF.

It would have been obvious to one of ordinary skill in the art to use a supplemental circuit to boost the voltage in order to enable the switch of the clamping circuit. As for the supplemental circuit comprises a bipolar Royer oscillator capable of operating at an input voltage of approximately 0.5 volts, it would have been obvious to one of ordinary skill in the art to use a

bipolar Royer oscillator as merely a design choice as a selection of specific well known elements to perform a specific function.

Re-claim 9 Patil et al. was silent to disclose wherein the clamping circuit comprises switch circuitry enabled during vehicle startup and shutdown.

It would have been obvious to one of ordinary skill in the art to enabling the clamping circuit during vehicle startup and shutdown in order to ensure the generation of a force during a failure of the suspension device so as to provide safety.

Re-claim 11 Patil et al. failed to disclose wherein the clamping circuit comprises switch circuitry pulsed to change the passive damping characteristic of the actuator.

Murty teaches, as shown in fig. 2, wherein the output of the microcomputer 35 is a pulse modulated switching voltage which is provided to a switch 30 (part of the clamping switch) and thus control resistor 23 and the damping of the suspension, see col. 3, lines 52-57.

It would have been obvious to one of ordinary skill in the art to merely provide the suspension system of Patil et al. with the known use of the output of the microcomputer, a pulse modulated switching voltage, which is provided to a switch (part of the clamping switch) and thus control resistor and the damping of the suspension, as taught by Murty, in order to change the passive damping characteristic of the actuator so as to adjust the damping.

This ground of rejection is respectfully traversed.

*In KSR Int'l Co. v. Teleflex Inc.*, 82 U.S.P.Q. 2d 1385, 1396 (U.S. 2007), after stating the steps “in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent in issue”, the Court said, “To facilitate review this analysis should be made explicit.” See *In re Kahn*, 441 F.3d 977, 988 (CA Fed. 2006) (“[R]ejections on obvious grounds cannot be sustained by mere conclusory statements, instead there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”).

“A fact finder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning. See *Graham*, 383 U.S., at 36 (warning against a “temptation to read into the prior art the teachings of the invention in issue” and instructing courts to “guard against slipping into the use of hindsight” (quoting *Monroe Auto Equipment Co. v. Heckethorn Mfg. & Supply Co.*, 332 F. 2d 406, 412 [141 USPQ 549] (CA6 1964))). *Id.* 1397.

In *Ex parte Aylward*, (BPA&I, Appeal No. 2007-2368 December 4, 2007) the Board said in reversing a final rejection,

"Both anticipation under §102 and obviousness under §103 are two-step inquiries. The first step in both analyses is a proper construction of the claims . . . . The second step in the analysis requires a comparison of the properly constructed claims to the prior art". *Medichem, S.A. v. Rolabo, SL*, 353 F. 3d 928, 933 (Fed. Cir. 2003) (internal citations omitted);

#### A. CLAIM CONSTRUCTION

"The Patent and Trademark Office (PTO) must consider all claim limitations when determining patentability of an invention over the prior art." *In re Lowry* 32 F. 3d 1579, 1582 (Fed. Cir. 1994) (citing *In re Gulack*, 703 F. 2d. 1381, 1385 (Fed. Cir. 1983). Slip Op. Pp. 7-8.

\* \* \*

"In rejecting claims under 35 U.S.C. § 103, the examiner bears the initial burden of presenting a *prima facie* case of obviousness." *In re Rijckaert*, 9 F.3d 1531, 1532 (Fed. Cir. 1993) (citing *in re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992)). "A *prima facie* case of obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art." *In re Bell*, 991 F.2d 781,783 (Fed. Cir. 1993) (quoting *In re Rinehart*, 531 F. 2d 1048, 1051 (CCPA 1976)).

In *Ex parte Hamilton* (BPA&I Appeal No. 2007-3091, March 11, 2008) in reversing a final rejection the Board said:

The test for obviousness is what the combined teachings of the references would have suggested to one of ordinary skill in the art. See *In re Kahn*, 441 F.3d 977, 987-88 (Fed. Cir. 2006), *In re Young*, 927 F.2d 588, 591 (Fed. Cir. 1991), and *In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

The Examiner can satisfy this burden by showing some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *KSR Int'l. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007) (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). Slip Op. Pp. 5-6.

We have shown above that the primary reference does not anticipate claims 1 and 6 upon which claims 3-5 and 7-9 and 11 depend. It is therefore impossible to combine the references to meet the limitations of these claims.

Moreover, the reference to "as merely a design choice of selecting a well known element to perform a specific function" is a conclusion, not a proper reason for maintaining the rejection.



In *In re Garrett*, 33 PTCJ 43 (BPA&I, September 30, 1986) the Board criticized the Examiner's statement that the proposed modification would have been "an obvious matter of engineering design choice" as a conclusion, not a reason, in reversing the Section 103 rejection.

"Moreover, we observe that even if these references were combined in the manner proposed by the examiner, that which is set forth in appellant's claims . . . would not result." *Ex parte Bogar*, slip op. p.7 (BPA&I Appeal No. 87-2462, October 27, 1989). "Even if we were to agree with the examiner that it would have been obvious to combine the reference teachings in the manner proposed, the resulting package still would not comprise zipper closure material that terminates short of the end of the one edge of the product containing area, as now claimed." *Ex parte Schwarz*, slip op. p.5 (BPA&I Appeal No. 92-2629 October 28, 1992). "Although we find nothing before us indicating why it would be desired to combine the references in the manner urged by the examiner, it is clear to us that such a modification by itself would not result in that which is set forth in the claims." *Ex Parte Kusko*, 215 U.S.P.Q. 972, 974 (BPA&I 1981).

The invention disclosed in this application and claimed in Claim 4 uses a solid state switch or relay to clamp the leads. The reference discloses using mechanical relays. Solid state switches or relays are especially advantageous when used in a vehicle suspension because as explained in the specification "mechanical relays are prone to failures when subjected to the vibration and temperature extremes found in a vehicle suspension." Normally closed solid state switches in higher power configurations necessary for this application do not exist. Only normally open high power solid state switches presently exist. In order to close the normally open solid state switch, power must be applied (and maintained) to the control terminal of the switch. This power is different from (although it is derived from) the power that flows through the switch and through the actuator coils to provide damping.

## CONCLUSION

In view of the foregoing authorities and remarks and the inability of the prior art alone or in combination, to anticipate, suggest or make obvious the subject matter as a whole of the invention disclosed and claimed in this application the decision of the Examiner finally rejecting claims 1, 3-6, 9, 10 and 11 should be reversed. Should the Board be of the opinion that one or

more claims may be amended to overcome a specific rejection, the Board is respectfully requested to include an explicit statement to that effect and direct entry of an amendment in conformity therewith.

The brief fee in the amount of \$540 is being paid concurrently herewith on the Electronic Filing System (EFS) by way of a Deposit Account authorization. Please apply any other charges or credits to Deposit Account No. 06-1050, referencing order no. 02103-0381001/S16.

Respectfully submitted,  
FISH & RICHARDSON P.C.

14 September 2010  
Date: \_\_\_\_\_

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*(viii) Appendix of Claims*

1. An active vehicle suspension system with fail-safe operation comprising:  
an actuator with an armature and a stator,  
the stator having at least one coil with coil ends,  
power electronics connected to the coil ends constructed and arranged to deliver power to the actuator through the coil ends, and  
a fail-safe clamping circuit connected to the coil ends powered by energy produced from movement of the actuator that is directly conveyed to the clamping circuit from the coil ends, to passively damp the actuator during a failure of the power electronics by clamping the coil ends together.
3. The system of claim 1 in which there are multiple coils, and the clamping circuit electrically connects coil ends together to change the passive damping characteristic of the actuator.
4. The system of claim 1 in which the clamping circuit comprises a solid-state device.
5. The system of claim 4 with the clamping circuit comprising a rectifier and a single unidirectional switch.
6. The system of claim 1 in which movement of the actuator generates a back electromotive force (EMF) as a result of the armature moving relative to the stator within the actuator, the back EMF powering the clamping circuit.
7. The system of claim 6 also comprising a supplemental circuit for boosting the back EMF.
8. The system of claim 7 in which the supplemental circuit comprises a bipolar Royer oscillator capable of operating at an input voltage of approximately 0.5 volts.

9. The system of claim 1 in which the clamping circuit comprises switch circuitry enabled during vehicle startup and shutdown.

11. The system of claim 1 in which the clamping circuit comprises switch circuitry pulsed to change the passive damping characteristic of the actuator.

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*(ix) Evidence Appendix.*

None.

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*(x) Related Proceedings Appendix*

None.